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## Sharing the care of older parents

Tolkacheva, N.

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## CHAPTER 2

### Sibling Influence on Care Given by Children to Older Parents<sup>1</sup>

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<sup>1</sup>The paper on which this chapter is based has been published as: Tolkacheva, N., Broese van Groenou, M., Van Tilburg, T. (2010). Sibling influence on care given by children to older parents. *Research on Aging*, 32, 739 – 759. Available online within Open Access funded by the Netherlands Organization for Scientific Research (file number 036.001.208).

### Introduction

As the population is aging, the number of older people in need of care is expected to increase. In addition to older people's spouses, their adult children are an important informal source of care. Because life expectancy increases, adult children are likely to provide care to their parents for a longer period of time. Ample research has been conducted on filial caregiving and how children organize the help they give to their older parents (Matthews, 2002). As most older adults have at least two children (Rogerson & Kim, 2005) and the longer life expectancy and higher probability of children's survival increase the number of overlapping years in siblings' lives (Connidis, 2005), it is important to understand how caregiving is organized in families with multiple children.

The literature on filial caregiving broadly describes its determinants. As reported by Soldo, Wolf and Agree (1990), the type and amount of care needed by parents are the strongest predictors of the care given by children. Parents' care needs are shaped by their age and physical disabilities, the professional help they receive and the availability of caregivers other than children, such as partners (Barret & Lynch, 1999). Additionally, we know there are caregiving differences between children in a given family; one child helps more than another. Dilworth-Anderson, Williams and Cooper (1999) identify primary, secondary and tertiary caregivers on the bases of their roles and responsibilities. Many studies show which characteristics of individual children are most conducive to caregiving and which children become their parents' primary caregivers. Being a daughter, having enough time (i.e. being geographically proximate, not having a job or competing family responsibilities), being emotionally close and having frequent contact with their parents predict whether and how much children assist their parents (Cicirelli, 1983; Connidis, Rosenthal, & McMullin, 1996; Dwyer & Coward, 1992; Klein Ikkink, Van Tilburg, & Knipscheer, 1999; Parrott & Bengtson, 1999; Stoller, Forster, & Duniho, 1992). Most of these determinants derive from the intergenerational solidarity framework, which is one of the concepts commonly used to explain the mechanisms of parent-child caregiving (Bengtson & Roberts, 1991).

The typical focus of caregiving research is limited to the relationship between a parent and an individual caregiving child which involves an intergenerational approach and emphasizes the parent-child dyad. There are theoretical grounds for such an approach: the term *filial* means son-like or

daughterly and draws attention to the parent-child dyad rather than to the ties between all family members (Matthews, 2002). However, the fact is often overlooked that in multiple-child families, parent-child dyads are embedded in the entire family and are part of a larger system of relations in which siblings affect the dyadic interaction. A limited number of studies took the entire family context into consideration. Some focused on the gender composition of the sibling group (Coward & Dwyer, 1990; Matthews, 1995). Pyke and Bengtson's (1996) study identified individualist and collectivist systems of family elder care, reflecting interdependence in family relations. There is some evidence on how care is divided across siblings in multiple-child families (Wolf, Freedman, & Soldo, 1997), however systematic knowledge about sibling influence on an individual child's caregiving is rather limited. In the current research we look at the caregiving of an individual child; furthermore we will elaborate upon the predictors of filial caregiving cited earlier by studying the impact of caregiving by siblings and sibling characteristics on any one sibling's caregiving, or, from the parent's perspective, any one child's caregiving. Our main goal is to investigate to what extent and in what ways siblings influence the care a child provides to his or her older parents.

Putting caregiving in a family context broadens the discussion about the complexity of the processes behind caregiving. There are not only intergenerational but also intragenerational bonds that are important. Evidently, each child in a family has his or her own motivations and opportunities to meet parental needs. The process of caregiving, however, is complicated by the fact that in multiple child families a child is not likely to care in complete isolation. The sibling caregiving and siblings' opportunities to care are likely to influence the caregiving of an individual child. On the one hand, the interdependence of a child's individual choices and his or her siblings' choices reflects the norm of adult sibling solidarity described by Allan (1977). Adult siblings are not required to interact often, but nonetheless belong to the same family and can therefore rely on each other and be mobilized, especially in a family crisis. On the other hand, the adult sibling bond has to some degree an ambivalent nature, which is usually described as contradictions within social relations or co-existence of solidarity and conflicts (Connidis & McMullin, 2002). The sibling bond is simultaneously a kin relationship, representing a certain level of obligation to each other, and a non-kin relationship with a certain level of voluntary choice and independence (Walker, Allen, & Connidis, 2005). According to the notion of ambivalence siblings might weigh the norm of solidarity and joint responsibility for the well-being of the parent against

their individual ideas on the division of care. The latter regards sibling considerations described by Silverstein, Conroy and Gans (2008) who suggested that care division reflects the outcome of each child's decision in which one's own benefits and costs of caring are outweighed against the perceived benefits and costs of caring by siblings. An adult child may count on sharing care with his or her siblings and being jointly responsible for parental well-being. However, joint responsibility can be shaped by different factors related to family size, sibling roles and opportunities to care. In the current paper we will consider three aspects of sibling influence on a child's caregiving in this paper: the extent of sibling joint caregiving efforts, size and gender composition of a sibling group and sibling characteristics and opportunities to provide care.

*Sibling caregiving.* A child can be expected to be aware of how much care his or her siblings give their parent, even if the amount of help provided is not discussed among children. Siblings do not always communicate directly with each other, but often through a living parent or another of the siblings (Allan, 1977); therefore, a certain level of family interaction around care can be assumed. Subsequently, a child is likely to respond to his or her siblings' caregiving. Different mechanisms related to the notion of ambivalence might determine child's response, such as self-interest of free-riding, expressed in a possible trade-off of caregiving efforts among siblings (Wolf et al., 1997; Silverstein et al. 2008) and the norm of sibling solidarity (Allan, 1977), which encourages a sense of joint filial responsibility for a parent and parental well-being and promotes cooperative caregiving efforts among siblings who are mutually stimulated (Matthews, 2002). According to the norm of solidarity, it is in a child's best interest to help siblings provide parent care. From the siblings perspective, if free-riding occurs, imbalances in siblings' contributions to care might result in feelings of unfairness and inequality. The siblings who are less involved with care may experience distress and consequently do their best to create or restore equity by jointly increasing their efforts (Walster, Walster, & Berscheid, 1978). At the same time siblings who are intensively involved with care could resolve unfairness by asking their siblings to alter caregiving behavior on fair basis (Ingersoll-Dayton, Neal, Ha, & Hammer, 2003). Otherwise, normative sanctions and sibling conflicts may disrupt the sibling bond. We expect that the norm of solidarity or joint care responsibility among siblings would be the leading mechanism in the influence of siblings on child's caregiving behavior. Therefore our first hypothesis reads: *To the*

*extent that siblings provide care with higher intensity, an individual child will provide care with higher intensity as well.*

*Number of sisters and brothers.* Sibling joint responsibility can be shaped by the size and gender composition of a sibling group. It is clearly easier for a child to provide less parent care in large families than in small ones. There is a strong link between parent care and the size of the sibling group (Parrot & Bengtson, 1999); when there are more siblings, each child is likely to give less care. Ward, Spitze and Deane (2009) studying multiple parent – adult child relationships, applied the concept of collective ambivalence and demonstrated that having more children increases the likelihood of having positive and negative relationships. The latter proposes that in larger families joint responsibility is likely to be lessened by at least some of the siblings. Furthermore, filial caregiving is highly gendered, so the gender composition of the sibling group may be even more important than its size. Being a sister suggests a different caregiving role than being a brother (Matthews, 1995, 2002; Silverstein et al., 2008). In particular, the presence of sisters affects the intensity of other children's caregiving. The more sisters a child has, the lower the number of parent care hours (Wolf et al., 1997). There is a similar pattern regarding intergenerational contact: the more sisters, the lower the parent-child contact frequency (Van Gaalen, Dykstra, & Flap, 2008). In her earlier work, Matthews (1995) studies families with lone sisters and their brothers and shows that lone sisters are viewed as the primary caregiver. Not only do lone sisters consider the contributions of their brothers as relatively unimportant, so do the brothers themselves. Coward and Dwyer (1990) examine various gender compositions in the sibling network (i.e., only-child, single-gender and mixed-gender). Their study shows that in mixed-gender families, daughters provide more hours of daily care and engage in more caregiving activities than sons. In only-child and single-gender families, they note similar numbers of hours and similar caregiving activities by daughters and sons. It seems that sons and daughters behave differently if there are daughters in the family available for caregiving. The second hypothesis is thus: *The more siblings, but in particular the more sisters there are, the less intense each child's caregiving is likely to be, regardless of the child's own gender.*

*Sibling characteristics.* Sibling solidarity can also be shaped by the characteristics of siblings. Some evidence suggests that a child helps the parents more intensively if the child has characteristics that are more conducive to caregiving than the characteristics of that child's siblings. In her qualitative study

on siblings meeting the needs of their older parents, Matthews (2002) notes, for example, that living just a few miles farther away from a parent or having a less flexible job than a sibling are reasons for helping less often. We assume that a child's individual caregiving is to some degree driven by the relativity of his or her own and siblings' caregiving characteristics, such as job and family responsibilities, geographic proximity, and emotional support exchanged with a parent. A child might adjust the amount of care offered dependent on how conducive the opportunities and characteristics of child's siblings are. Our third hypothesis is therefore: *An individual child provides less care if his or her siblings have characteristics that are more conducive to caregiving.*

### Method

#### *Respondents*

Data have been collected in the context of *Family Caregivers of Older Adults*, a side-study of the *Longitudinal Aging Study Amsterdam* (LASA). LASA is an ongoing study on the physical, social, cognitive and psychological functioning of Dutch older adults. The main LASA data collection consists of interviews conducted every three years with a representative sample of 3107 Dutch older adults aged 55 - 85 (baseline in 1992). The data collection for the side-study on family caregivers was conducted in 2000/2001. The sample for the side-study has been selected from the respondents of the 1998/1999 LASA collection year ( $N = 2545$ ). The selected respondents ( $n = 354$ ) are older parents who live independently, are cognitively capable of answering the questions (The Mini-Mental State Examination score  $\geq 24$ ), report functional limitations, have at least one major or minor chronic disease, and receive formal and/or informal care with personal and domestic activities at the time of the main observation. Of the 354 respondents approached, 289 participated in the side study. Respondents who did not live independently at the time of approach were excluded ( $n = 20$ ). Non-response ( $n = 45$ ) was due to refusal, mental or physical frailty and death (Knipscheer & Broese van Groenou, 2004).

As our study focuses on siblings, we only analyze the data of respondents with at least two children. We exclude respondents who only have one child ( $n = 65$ ) or do not provide any information about their children ( $n = 3$ ). We also exclude respondents with a partner living outside the household ( $n = 8$ ) or a child living in

the household ( $n = 27$ ). These family situations with specific caregiving circumstances should be analyzed as separate groups, but are too small in number for a proper analysis. The remaining sample of parents ( $N = 186$ ) consists of 66 male and 120 female care recipients between the ages of 63 and 91 who live independently and have at least two non-residential children. The parents reported on their own characteristics as well as the characteristics and care activities of all of their children ( $N$  children = 703, range 2 - 15, on average 3.8 per parent).

### *Measurements*

*Caregiving intensity.* We measured caregiving intensity as the frequency of giving care on ten tasks. Each parent provided information on the care given by all of the children pertaining to ten activities (cooking, shopping for groceries, cleaning, transportation, seeing to financial matters, washing, taking bath or shower, getting dressed, going to the toilet and getting up or sitting down). For each of the activities, the parents were asked how often each of their children provides care (coded as 0 = *never*, 1 = *seldom*, 2 = *sometimes* and 3 = *often*). We compute the caregiving intensity of each child as a total sum of the help provided in all the activities. Because different aspects of care are important in different situations and are often provided by different children, we are interested in the total intensity of care a child provides regardless of the type of activity. We therefore accept a low reliability (Cronbach's alpha is 0.63). The caregiving scale theoretically ranges from 0 to 30, with zero indicating that a child never provides any type of care and 30 indicating that the child helps frequently with all of the various activities.

*Parent characteristics.* A number of parent characteristics are available for the current study: gender (0 = *man*, 1 = *woman*), age (in years), functional capacity to perform activities in daily life (ADL), self-perceived health, number of chronic diseases from the seven major diseases listed below, presence of a partner in the household, receiving help from a partner and receiving professional care. A scale score (theoretical range from 6 to 30) for functional capacity is calculated on the basis of six items, i.e., the ability to walk up and down stairs, to dress and undress, to sit down and stand up, to trim one's own toenails, to walk five minutes outside the home and to drive a car or use public transportation. The response categories are 1 = *no, I cannot do it*, 2 = *only with help*, 3 = *yes, with a great deal of difficulty*, 4 = *yes, with some difficulty*, and 5 = *yes, without help*. Cronbach's alpha for these items is 0.78. Self-perceived health is measured by



asking *How is your health in general?*, and responses range from 1 (*poor*) to 5 (*excellent*). The total number of major chronic diseases is counted (ranging from 0 to 7), consisting of chronic non-specific pulmonary disease, cardiac disease, peripheral atherosclerosis, cerebrovascular accident, diabetes mellitus, joint disease and malignant neoplasm.

If they had a partner, the older adults were asked to estimate the frequency of help received from the partner with the same ten tasks used to measure the children's assistance. We distinguish two variables: the presence of a partner (1 = *yes*, 0 = *no*) and the amount of help provided by the partner (theoretical range 0 – 30). Missing values in the case of no partner are replaced by the overall average amount of help provided by a partner. We classify professional help with home care as coming from at least one of the following sources: district nurse, professional home help or institutionally organized help.

*Children and sibling characteristics.* The parents provided information on all of their children regarding their gender (0 = *son*, 1 = *daughter*), age, partner status (0 = *no*, 1 = *yes*), employment status (0 = *not employed*, 1 = *employed part-time or full-time*), and age of the youngest grandchild (0 = *no young grandchild*, 1 = *at least one grandchild under 16*). Information about travelling time was provided by asking *How long does it take (in minutes) to travel to (name of the child) with the type of transportation you are used to?* and was recoded in hours ranging from 0 to 24. The exchange of emotional support was provided by the parent at the original 1998/1999 observation and is measured as an average frequency of talking about personal experiences and feelings between parents and children. The answer categories are 1 = *never*, 2 = *rarely*, 3 = *sometimes*, and 4 = *often*.

### *Procedure*

For each child we calculate the number of sisters and brothers, the average caregiving intensity of all the siblings, the proportion of siblings with partners, the proportion of employed siblings, the proportion of siblings with their own children under 16, the average travel time between the siblings and the parent and the average frequency of the siblings' emotional support exchanges with the parent.

We apply a multilevel regression model and analyze our data using the MLwin program (Rasbash, Steele, Browne, & Prosser, 2004). The data of each child includes the child's individual caregiving and characteristics, as well as averages of caregiving by siblings and averages and proportions by sibling

characteristics. The child's caregiving and characteristics and average siblings caregiving and characteristics (Level 1) are nested within observations of parent characteristics (Level 2). Multilevel bivariate regression analysis is conducted to test the impact of each predictor separately, followed by multivariate regression analysis. We apply the endogenous feedback or autoregressive model (Erbring & Young, 1979). This model relates to the various hypotheses on the mutual adjustment of the intensity of a child's and his or her siblings' caregiving and their other characteristics. Central in this model is that individual outcomes are the result of group processes. More specifically, we analyze the intensity of care given by a child to a parent as a result of the average intensity of care provided by an entire set of siblings. The contextual effect might result from manifest or implicit sibling interaction. The caregiving by an individual child is thus assumed to be dependent on and to influence the caregiving of the siblings. In our multilevel model we specify this mutual dependence for each child as a regression of the intensity of care provided by the specific child on the average intensity of care provided by the siblings.

In addition to this social-structural dependence there is also statistical dependence. For example, for a parent with three children, the care provided by the children is measured independently, and consequently, for a specific child, the care he or she provided is measured independently from the average care provided by his or her siblings. However, within a family (Level 2), the set of averages for the sibling characteristics is not independently measured. When we know the mean care provision by Child 1 and Child 2 and for both their mean sibling care provision, we are able to compute the individual and mean sibling care provision for Child 3. The inclusion of these child and sibling characteristics results in the disappearance of variance at Level 2. However, due to the statistical independence at Level 1, the analysis is expected to provide consistent estimates of the model parameters.

An analysis is also conducted to determine the extent to which the parameter estimates from the endogenous feedback model are sensitive to changes in the structure of the model. For this sensitivity analysis, the input into the model is limited to Level 1 data from one child in each family. This child is randomly chosen and the procedure eliminates hierarchy in our data and autoregression. Subsequent regression analyses are conducted for three other children at most because few families have more than four children. The randomization is repeated ten times to exclude the possible effects of choosing a

random child, which are particularly relevant in the case of large families. For each explanatory Level 1 variable, the sensitivity analysis results in 40 estimates and the average of the regression coefficients is reported.

The multivariate multilevel model is constructed in five steps to estimate the impact of siblings on the intensity of a child's caregiving (dependent variable). In Step 1, the average intensity of care provided by the siblings is added to the multilevel regression equation (at Level 1) to test Hypothesis 1. To test Hypothesis 2, the number of sisters and brothers is added in the second step (at Level 1). To test Hypothesis 3, the averages and proportions of the sibling characteristics (i.e., the proportions of siblings with partners, jobs and their own children, the average travel time and average frequency of emotional support exchange between siblings and their parent) are entered into the model in the third step (at Level 1). In Step 4, parent characteristics are entered to control for their need for help (Level 2 variables). These characteristics include gender, age, functional capacity, self-perceived health, number of chronic diseases, partner status, amount of help from the partner and use of professional help. In Step 5, the individual child's characteristics are added as earlier observed important predictors of caregiving (at Level 1): gender, age difference between child and parent (to avoid multicollinearity of the child's with the parent's age), partner status, employment status, having children under 16, travel time between a child and parent and emotional support exchange with a parent. The estimates of the final model are presented.

## Results

### *Descriptive Results*

As is reported in Table 2.1, the average intensity of the care given to a parent is low ( $M = 2.0$ ,  $SD = 2.7$ ) with a maximum score of 16 on the theoretical range from 0 to 30. About 80% of the older parents nonetheless receive at least some care from their children. The parents are between the ages of 63 and 91 and 65% of them are women. It is a group of older adults with an average of 1.8 chronic diseases and an average score of 23.5 on the functional capacity scale ranging from 10 to 30 (with 10 representing low functional capacity and 30 representing high functional capacity). About 3% of the respondents perceive their health as excellent and about 5% as poor. Most of the respondents perceive their health as

fair (about 37%) or good (about 39%), and about 16% as sometimes poor and sometimes good. About 48% of the older parents do not have a partner. The average intensity of care provided by the partner for those who do have one is 10.3 with a maximum score of 25 on a theoretical range of 0 to 30 (again, from low to high). About 31% of the older parents receive professional help.

Table 2.1. Parental (N = 186) and Child's (N = 703) Characteristics and Caregiving Intensity: Descriptive Statistics

	%	<i>M</i>	<i>SD</i>	Range
Parental gender (female)	65			0 or 1
Parental age		78.47	7.48	63 to 91
Parental functional capacity: higher score - higher capacity		23.49	5.10	10 to 30
Parental self-perceived health: higher score – better health		3.17	0.91	1 to 5
Parental number of chronic diseases		1.81	1.22	0 to 7
Parental partner status (having a partner)	52			0 or 1
Caregiving intensity provided by a partner		10.28	3.08	0 to 25
Professional help provided to a parent (receiving help)	30			0 or 1
Child's caregiving intensity		2.04	2.71	0 to 16
Child's gender (female)	50			0 or 1
Child's age		47.13	8.15	24 to 77
Child's partner status (having a partner)	87			0 or 1
Child's employment (having a job)	75			0 or 1
Child's own children < 16 years old (having children)	41			0 or 1
Travel time between a child and a parent		1.11	2.67	0 to 24
Frequency of emotional support exchange between a child and a parent		2.96	0.82	1 to 4
Child's number of sisters		1.94	1.73	0 to 10
Child's number of brothers		1.86	1.50	0 to 8

Almost half of the children ( $n = 308$ ) do not give their parents any care. While there are some children who are the only caregiver in the family ( $n = 32$ ), most children that help their parents share the care with siblings. The number of siblings varies from 1 to 14; half of them are sisters. Most of the children have sisters in their sibling group, but of the 703 children, 64 sons and 56 daughters have no sisters. Aged 24 to 77 ( $M = 47.1$ ,  $SD = 8.2$ ), most children have competing responsibilities: partners (87%), jobs (75%) or children under 16 in the household (40%). On average, the travel time between the children and parents is about an

hour. On average, the children and parents sometimes exchange emotional support.

### *Regression Analysis Results*

Table 2.2 presents the variance decomposition of the multilevel regression analysis of the child's caregiving intensity. The empty model shows that children in the same family give various intensities of care and that differences between the families (Level 2) are smaller than the differences within families (Level 1). Each successive step of analysis improves the model significantly. After adding the average caregiving intensity by siblings, the variance at the parent level is reduced to zero, as is to be expected within the endogenous feedback model, and the variance at Level 1 increases. After adding the number of sisters and brothers to the model the variance at the parent level slightly increases and after adding averages and proportions of sibling characteristics the variance at the parental level decreases. After adding the parental characteristics and individual child's characteristics, the variance at Level 1 continues to decrease.

Table 2.2. The Results of Multilevel Multivariate Regression Analysis of Child's Caregiving Intensity: Variance Decomposition and Variance Reduction (N = 186 parents with 703 children)

	Variance					
	Level 2	Level 1	-2LL	df	$\chi^2$	
0-model	1.90	5.50	3342.49			
Sibling caregiving intensity	0	6.06	3322.29	1	20.20	***
Number of sisters and brothers	0	6.55	3316.15	2	6.14	*
Siblings' characteristics	0	6.43	3303.70	5	12.45	*
Parents' characteristics	0	6.19	3276.53	8	27.17	***
Child's characteristics	0	5.49	3193.31	7	83.22	***

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Let us now turn to the regression coefficients as estimated within the multilevel model (Table 2.3). The first column of Table 2.3 shows the results of the bivariate regression analysis for each parameter separately, the second column the results of the final model of the multivariate regression analysis and the third column the results of the final model of the sensitivity analysis. To test Hypothesis 1, we estimate the influence of the average intensity of caregiving by siblings on

Table 2.3. Results of Multilevel Bivariate and Multivariate Regression Analysis of Child's Caregiving Intensity: Regression Coefficients of the Final Model (N = 186 parents with 703 children); Results of the Sensitivity Analysis

	Multilevel regression analysis				Sensitivity analysis	
	Bivariate		Multivariate		Multivariate	
	<i>B</i>	<i>SE B</i>	<i>B</i>	<i>SE B</i>	<i>B<sup>a</sup></i>	<i>SE B<sup>b</sup></i>
Constant			-1.31	1.83	-0.92	4.50
Sibling caregiving intensity						
Average help provided by siblings	0.42***	0.04	0.29***	0.05	0.39	0.12
Number of sisters and brothers						
Number of sisters	-0.20*	0.09	-0.18**	0.06	-0.17	0.17
Number of brothers	0.27**	0.10	0.01	0.07	0.03	0.19
Siblings' characteristics						
Proportion of siblings with partners	1.29*	0.50	0.97*	0.41	0.93	1.08
Proportion of employed siblings	-0.36	0.40	0.09	0.33	-0.01	0.89
Proportion of siblings with own kids	-0.60	0.33	-0.31	0.31	-0.19	0.79
Average travel time between siblings and a parent	0.04	0.06	-0.04	0.05	-0.05	0.14
Average emotional support exchange by siblings	0.10	0.18	-0.39*	0.18	-0.38	0.45
Parents' characteristics						
Gender	0.43	0.29	0.26	0.22		
Age	0.05*	0.02	0.02	0.02		
Functional capacity	-0.12***	0.03	-0.06**	0.02		
Perceived health	-0.24	0.15	-0.03	0.11		
Chronic diseases	0.00	0.12	-0.18	0.09		
Having a partner	-1.16***	0.26	-0.65**	0.22		
Help from available partner	0.12*	0.05	0.06*	0.03		
Use of professional help	0.76**	0.30	0.05	0.22		
Child's characteristics						
Daughter	1.09***	0.19	0.79**	0.20		
Age difference with parent's age	0.02	0.02	0.01	0.02		
Partner available	-0.21	0.29	-0.29	0.28		
Being employed	-0.48*	0.23	-0.02	0.21		
Having children younger than 16	-0.19	0.20	-0.11	0.20		
Travel time between a child and a parent	-0.14***	0.04	-0.14***	0.03		
Exchanges of emotional support	0.87***	0.13	0.78***	0.15		

<sup>a</sup>Averages of regression coefficients derived from 40 repeated regression analyses on a randomly chosen child for each parent ( $n = 186$  parents). <sup>b</sup>Averages of standard errors derived from 40 repeated regression analyses on a randomly chosen child for each parent ( $n = 186$  parents).

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

an individual child's caregiving intensity. The results of bivariate and multivariate analyses are similar. They suggest that a child cares jointly with his or her siblings given that a higher average intensity of caregiving by siblings is associated with a child's higher caregiving intensity ( $B$  multivariate = 0.29,  $p < .001$ ).

Hypothesis 2 tests whether having more brothers and sisters is related to a child giving less intense care. The bivariate parameter estimate shows that a child's caregiving intensity correlates positively with the number of brothers and negatively with the number of sisters. Controlling for other independent variables in the multilevel multivariate regression analysis model, the parameter estimate for the number of brothers becomes insignificant after adding the child's gender to the equation. This result means that the opposite effect of bivariate estimates for brothers and sisters does not offer a sufficient picture for the interpretation of our results. The gender of a child is important in explaining how sibling gender composition influences a child.

Hypothesis 3 focuses on whether children provide more intensive care if their siblings do not have conducive caregiving characteristics. The bivariate and multivariate results show a significant positive effect of the proportion of siblings with partners on the individual child's caregiving intensity ( $B$  multivariate = 0.97,  $p < .05$ ). It suggests therefore that a child gives more care when more of his or her siblings have partners. In the multivariate regression analysis after controlling for individual child's emotional support exchange with a parent, also the average emotional support exchange between siblings and a parent is significant ( $B = -0.39$ ,  $p < .05$ ). This result shows that the child provides more care when siblings have a lower average frequency of emotional support exchanges with a parent.

Concerning the parent characteristics (Step 4), the multivariate analysis shows that children give more care to older parents with low functional abilities, without a partner or with a higher intensity of care provided by the partner. The bivariate positive effect of the use of professional help and the effect of parental age disappears in the multivariate model after adding the parent's partner status into the equation. As to the characteristics of the individual child (Step 5), being a daughter, living close to a parent and having frequent exchanges of emotional support with a parent are associated with a higher intensity of care. The bivariate negative effect of being employed becomes insignificant when controlling for the child's gender.

The results of a sensitivity analysis on a child chosen randomly in each family (Table 2.3) are similar to those of the endogenous feedback multilevel regression model. Due to smaller sample size the standard errors in the sensitivity analysis are larger for some variables compared to multilevel regression analysis, whereas the parameter estimates remain about the same. In conclusion, the parameter estimates from the endogenous feedback model are almost not affected by changes in the structure of the model; the endogenous feedback model seems to provide proper parameter estimates.

## Discussion

The current study focuses on the impact of siblings on children's caregiving in multiple-child families. We add to the existing knowledge an improved explanation of individual children's caregiving and show that individual caregiving is partly the result of a sibling group process, supporting the idea of sibling solidarity. In particular, siblings jointly provide caregiving to their parent: a child's caregiving is more intensive if caregiving by siblings is more intensive as well. At the same time, sibling solidarity can be shaped by the gender composition of a sibling group and siblings' opportunities to care: a child's caregiving is related to the number of sisters he or she has, to the proportion of siblings with partners and sibling average frequency of emotional support exchanges with the parent. Child cares less for a parent when siblings have more conducive roles or opportunities to care (i.e. being sisters, not having competing family responsibilities or actively exchanging support with a parent). The contribution of siblings to an individual child's caregiving is smaller, however, than the contribution of more commonly used predictors (i.e. parental and child's individual characteristics).

To test the first hypothesis, we examined the influence of caregiving intensity by siblings on a child's caregiving intensity. Our result suggests the existence of sibling solidarity in the families of older parents. It seems that if a parent requires care, siblings, stimulating each other or by a parent, all increase their efforts. This result is in line with a previous longitudinal study, which demonstrated that a child's behavior is in part influenced by the participation of his or her sibling network (Dwyer, Henretta, Coward, & Barton, 1992). In their study, the adult children seem to respond to parental needs in concert with one or more of their siblings: when siblings started providing help, children's assistance was greater and when siblings stopped helping, adult children were more likely to stop



their assistance as well. Our research does not confirm the results of the study by Wolf et al. (1997), who report a small negative association between the hours of parent care given by a child and the hours of parent care given by the child's siblings. An inconsistency like this can be explained by differences in parents' needs and in the type of care needed. Wolf et al. (1997) examine more comprehensive caregiving than in the situations in our study by restricting their sample to unmarried respondents without any residential help who are above 70 and have a wide range of ADL and IADL limitations. This suggests that the greater the parents' need for care, the more difficult it is for siblings to keep up the simultaneous joint care. The less comprehensive caregiving situations in our study may have facilitated sibling solidarity and joint efforts.

The second hypothesis asserts an association between a child's caregiving and the number of sisters and brothers he or she has. The hypothesis has been partly confirmed: a child provides less care when he or she has available sisters. The number of brothers does not seem to affect a child's caregiving after controlling for the child's gender. Our results confirm previous research results on the association between the number of sisters and the amount of help children give their parents (Wolf et al., 1997). The explanation might lie in the different roles of daughters and sons in maintaining and reestablishing the independence of their parents. As is shown by Matthews and Heidorn (1998), siblings in brothers-only sibling groups define their parents as self-sufficient even in precarious situations. If at least one sister is available in a sibling group, she is in charge of the caregiving (Matthews, 1995). In addition, the parents' gender distribution is skewed in that there are more mothers than fathers. It has been noted that there are more differences between sons and daughters in relation to their mothers than to their fathers (Silverstein, Bengtson, & Lawton, 1997). Sons are less likely to help their mothers, especially if at least one sister is available (Pillemer & Suitor, 2006). Coward and Dwyer (1990) find that although sons are more likely to help fathers than mothers, daughters are still more likely than sons to help both mothers and fathers. Our results suggest that the gendered nature of caregiving is, although perhaps implicitly, one of the leading factors in sibling decisions to take care of their parent in need. Sibling solidarity is therefore shaped by the availability of sisters in the sibling group.

The third hypothesis refers to the association between a child's caregiving and sibling characteristics. The proportion of siblings with partners and the average frequency of emotional support exchanges between siblings and a parent

are significant predictors of a child's caregiving. Our results corroborated with earlier research which showed that unmarried children provided more support to their mothers than did their married siblings (Silverstein et al., 2008). It seems that a child takes on caregiving responsibilities when siblings have competing demands (such as own family) or when siblings have emotionally poor relationship with a parent. Earlier research demonstrated that having a poor relationship with a parent improves the emotional support exchanged among siblings, which suggests a compensation of emotional support by siblings within a family system (Voorpostel & Blieszner, 2008). In keeping with this, the idea of sibling solidarity is corroborated by the notion that siblings support one another by taking on care responsibilities when some siblings are limited in their ability to provide care. We should bear in mind, however, that not all children may view their siblings' partners or emotionally poor relationships with a parent as legitimate reasons for those siblings to provide less care and to count on others. In this case, a child may increase his or her own efforts out of the necessity of meeting parental needs, instead of voluntarily to help a sibling; sibling solidarity would be therefore modified by siblings' opportunities. Regardless, the simultaneous emergence of different effects suggests a sibling solidarity that can be shaped by sibling roles and opportunities: siblings not only react at each other in emergency situations by mutually increasing caregiving efforts, they also take on more responsibilities if some siblings have emotionally poorer relationships with their parent or less opportunities to care.

The proportion of siblings with jobs and their own children, as well as the average sibling geographical proximity to the parent, seem to be unimportant to an individual child's caregiving. Matthews (2002) shows the relative significance of certain characteristics (i.e., age, gender, distance, employment status, marital status, responsibility for other family members, health status and socioeconomic status), but indicates that these characteristics are not of the same relative significance in all families. To explain their own behaviour, children not only refer to their own absolute situation (e.g. geographical proximity), but also to their relative situation (e.g. who lives closer). The current study uses a slightly different method, which might explain the inconsistency with Matthews' findings. We use the average sibling characteristics to demonstrate whether siblings are positively assessed for caregiving characteristics and we then control for individual children's characteristics. This allows the conclusion that one's own characteristics are more important than sibling characteristics in the provision of care.

In line with previous studies, this study also confirms earlier findings that daughters who live close by and have frequent emotional support exchanges with their parents provide more care and that parents with greater dependence (more health problems) are more likely to receive care from their children (e.g. Dilworth-Anderson et al., 1999). Parents without partners are also more likely to receive help from children, which is in line with the notion of substitution (Cantor, 1979). In contrast to what was expected, the help parents received from a residential partner increased the help received from their children. This result probably indicates a higher level of parental need; children and the spouse supplement each other in providing care to high-need parents. At the same time, this finding might suggest that help from the parent's partner is needed when both parents grow older, but that together they cannot provide sufficient help for one another, and still require assistance from children. For children, this would imply increasing care efforts as care is provided to two older parents instead of one. Most of the adult children are not the sole caretaker of their parent; our study shows that they are likely to share the care with the parent's spouse, their siblings or professional helpers. Future research on caregiving should acknowledge that caregiving is a multi-actor issue and go beyond the dyad of caregiver and care recipient in taking a family or network perspective.

Some comments should be made about the theoretical and methodological limitations in the study. Firstly, all information about the caregiving activities of each child is dependent on parents' reports. This has its disadvantages, as differences between families could be explained by differences in parental perspective rather than by differences in sibling networks. Parents tend to be egalitarian concerning their children, which might lead to an overestimation of the care provided by some of the children. As follows the extent of joint responsibility among siblings could be somewhat overestimated. At the same time, there are also advantages to such a data source that should be mentioned. Measurement errors within each family are minimized. Furthermore, we have a complete dataset about all children in a family, whereas receiving information from each child would doubtless lead to non-response from some of the children, which might be selective: children who do not provide any care would have a higher probability of non-participation.

The second limitation to be mentioned is that we assume a distribution of various activities among siblings, but we do not know how siblings communicate about this division of care. Is there an agreement about the division of labor? Does

a natural process develop within a family? Is the amount of caregiving and its distribution determined by the parent's or the child's preferences? We have no information on the interaction between siblings regarding caregiving, and studies that do (Matthews, 2002) show that this is important. Collecting information on sibling decision making, expressing appreciation and conflicts may enhance our insight on how siblings affect individual caregiving. A final limitation is that our cross-sectional, quantitative study cannot include information on the processes behind caregiving by siblings. We cannot tell about changing caregiving dynamics within families as life circumstances change (e.g. changes in job, geographic relocation or changing marital status). Our results, however, demonstrate that sibling solidarity influences caregiving behavior within sibling groups in a number of distinct and important ways.

In the current study, the role of siblings in a child's caregiving is shown to be limited but important. An individual child's characteristics and opportunities and the parents' care needs are not the only important predictors of a child's caregiving. A child's caregiving is also influenced by the availability, caregiving and characteristics of siblings. Children share care, children jointly respond to each other's parental caregiving and children support each other. This means children in small families run a greater risk of being overburdened than children in large families do. Given that baby boomers are growing older and future cohorts of older adults will have fewer children, this overburdening might soon become an important societal issue. At the same time, couples now have a greater chance of growing old together, which reduces the pressure on children because partners are an important source of informal care. This means that in the future, children will continue to play a supplementary role in caregiving.